USGS
science for a changing world

Biological and Ecological Science for *Michigan* "The Great Lakes State"

Michigan ranks second in the country in the number of non-resident anglers and third in total angler expenditures. USGS conducts hydroacoustic surveys to improve the information used to manage Michigan's world-class and economically-important sport fishery.

Michigan is rich in lakes, rivers, dune and rocky shorelines, forests, fish and wildlife, and has the longest freshwater coastline in the United States, 3,224 miles. Many enterprises critical to Michigan's economy and cultural heritage are based on natural resources including commercial and sport fishing, hunting, and other outdoor recreation. Overall, outdoor recreation is enjoyed by more than 63 percent of Michigan residents, and has been estimated to generate $18.7 billion in consumer spending, create 194,000 jobs, and raise $1.4 billion in State and local tax revenue annually.

The USGS Ecosystems Mission Area

The U.S. Geological Survey (USGS) Ecosystems Mission Area, the biological research arm of the Department of the Interior, provides science to help Michigan achieve sustainable management and conservation of its biological resources and the ecosystems that sustain these resources. This work is done within the broader mission of the USGS—to serve the Nation with science that advances understanding of our natural resources, informs land and water stewardship, and helps safeguard communities from natural and environmental hazards.

Sustaining the Michigan Great Lakes Fishery

Commercial, sport, and recreational fishing in Lakes Michigan, Huron, Superior, and Erie provide an economic driver and a way of life for Michigan's coastal communities. Michigan's Great Lakes recreational fishery alone generates $2.2 billion annually and supports nearly 20,000 jobs. For decades, the USGS has assessed populations of deep-water prey fish in all four lakes using oceanographic-sized research vessels. These assessments provide information for inter-jurisdictional State, Tribal, and Canadian Provincial decisions focused on ensuring sustainable fisheries.

Fighting a Damaging Invader

The parasitic sea lamprey invaded the Great Lakes in the mid-20th century and have had devastating economic and ecological effects on Great Lakes fisheries and ecosystems. The USGS works with the Great Lakes Fishery Commission, State agencies, Tribes, and the U.S. Fish and Wildlife Service to develop control technologies to keep sea lamprey populations at bay. The USGS maintains the United States and Canadian registrations for two pesticides used to fight this damaging invader and is investing $10 million for a new sea lamprey and aquatic invasive and native species laboratory in northern Michigan.

A sea lamprey can kill as much as 40 pounds of fish during its 18-month parasitic stage. The USGS and partners are developing pheromones to attract lampreys to traps, increasing catch rates by as much as 35 percent.

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Sometimes called "Giants of the Great Lakes", lake sturgeon can weigh more than 200 pounds and reach 8 feet in length. In the late 1800s at the peak of the Great Lakes fishery, more than 8.6 million pounds of sturgeon were harvested in a single year.

Bringing Back Lake Sturgeon

Lake sturgeon were once abundant throughout the Great Lakes, were a vital food and cultural resource for Michigan Tribes, and supported a vibrant commercial fishery. After a century of intensive fishing and habitat loss, particularly due to dams and other barriers to fish passage, lake sturgeon dwindled to only a few remnant populations. Improving habitat access is a key part of Michigan's sturgeon rehabilitation strategy. The USGS works with Michigan biologists to develop fish passage strategies with the greatest potential to increase lake sturgeon abundance in Lake Michigan and beyond.

Invasive zebra mussels are now part of many Michigan lakes and rivers. Michigan uses USGS science and technical assistance to control and prevent further spread of these and other damaging invasive species.

Restoration Science for Urban Revitalization

The Detroit and St. Clair Rivers and western Lake Erie are undergoing an ecological renaissance as coastal towns and cities turn back to the waterfront to revitalize their economies. Redevelopment efforts include restoration of coastal wetlands and creation of artificial fish spawning reefs to enhance clean water, fishing, boating, and other recreation opportunities. The USGS and partners developed tools that help coastal managers in Michigan integrate information to prioritize coastal wetland restoration actions that will help achieve the State's ecological vision.

Sharing Information about Wildlife Diseases

The USGS manages an internet-based tool, WHISPers, that provides managers with current information about wildlife diseases like chronic wasting disease, epizootic hemorrhagic disease, and avian influenza that can affect Michigan's game populations. Wildlife managers in Michigan use WHISPers to monitor the health of wildlife and develop strategies for responding to disease events, as well as to share information about disease occurrences with other scientists and managers. This tool is part of USGS efforts to work with partners to safeguard human, wildlife, and ecosystem health.

In 2015, avian influenza was detected in Canada geese in suburban Detroit, Michigan. The USGS partners with the U.S. Department of Agriculture to monitor for the early detection and mitigation of this highly pathogenic disease of poultry that circulates in wildlife.

Surveillance and Control Techniques for Unwelcome Invaders

Quagga mussels, zebra mussels, and the New Zealand mudsnail have invaded some lakes and rivers in Michigan, requiring costly surveillance, education, prevention, and management programs. These invaders can have negative repercussions for drinking-water infrastructure, recreation, and native species and their habitats. The USGS supports Michigan's managers as they work to prevent the spread of these invaders with scientific detection and monitoring tools, and by developing control measures.

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For more information: Ecosystems Mission Area
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